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EXAMINER	
FETZNER, TIFFANY A	

ART UNIT	PAPER NUMBER
2859	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/696,947	AGILANDAM ET AL.	
	Examiner	Art Unit	
	Tiffany A. Fetzner	2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/30/2003*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. *03/21/2005* .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 10/30/2005 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner has considered the information disclosure statement.

Drawings

2. The drawings are objected to because Figures 1 and 3 are not clear, they are mainly black squares the numbers in the lower left and upper left are legible but figure 3 which is supposed to be applicant's image showing the improvement is less discernable than figure 1, and figure 1 fails to resemble anything identifiable. If figure 1 is supposed to show human recognizable features they are not present in the image which has been supplied to the examiner.

3. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 1-13** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A) Specifically, in **claims 2, 8, 12,** and **13** applicant has a series of claim limitations delineated by If .... else ....statements. In claim limitations "If .... else ....statements" are indefinite because a conditional "If .... else ...." limitation indicates that a limitation might be, or might not be a limitation of the claim. Therefore the scope of what actually constitutes the features of the claim(s) is not clearly set forth.

B) The examiner is not permitted to guess as to the scope of applicant's claims. Correction is needed for each and every one of the "If ... else ..." statements found within the claims.

C) Applicant should also amend the specification to correct the "If ... else ..." statements within the specification which are identical to the claim to which that part of the specification corresponds. In order to rectify this problem the examiner suggests the following solution: First **replace** all of the "**if**"'s with the phase "**wherein when**" because the "**wherein**" connects the limitation to the limitations recited earlier in the claims. Second **replace** all of the "**else**"'s in the claims with the phase "**otherwise** performing the steps of: ..."

6. **Claims 1, 2, 8, 12,** and **13** are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: with respect to **claim 1**:

A) The actual RF pre-pulses, because applicant only obtains a first frequency for Rf pre-pulse, there is no statement that actual RF pre-pulses are applied or acquired. All that is acquired a frequency "for RF pre-pulse".

B) There is no initial main / static / uniform "Bo magnetic field" initially recited. [See the objection for lack of antecedent basis below.]

C) There is no limitation connecting the calculated results of steps c) and d) to the optimization of the pre-amble.

D) There is no recitation of pixels prior to step d) and no recitation of where the pixels respectively come from.

E) In **Claims 2, 8, 12,** and **13**:"improving the shimming" of what? , how?

F) In **claims 8, 12, 13** there are no actual RF pre-pulses, because applicant only obtains a first frequency for Rf pre-pulse, there is no statement that actual RF pre-pulses are applied or acquired. All that is acquired a frequency "for RF pre-pulse".

Claim objections

7. **Claims 1-13** objected to because of the following informalities:

A) In **claims 1-13** there are replete grammatical errors and typographical errors throughout the claims, which are to numerous for the examiner to correct. Applicant should review and correct all claims.

B) In claim 1 there Bo magnetic field, recited prior to step c. In step **a)** only "a Bo map for each slice" and not a composite, total, or main Bo map is provided. Appropriate correction is required.

C) In **Claims 2, 3, 8, 11, 12,** and **13 replace** "**B.sub.0**" with $\mathbf{B_0}$.

D) In **claim 3**, the dependency is incorrect, because there is no second frequency recited in **claim1**; the examiner suggests the dependency of **claim 3** should be **claim 2**.

E) **Claims 4, 5,** and **6** are objected to because there are no actual RF pre-pulses within claim 1; only a frequency that is "for RF pre-pulse" is recited. Stated another way the actual pre-pulses are absent from claim 1.

F) In **claim 7**, the dependency is incorrect, because the step from which the claim depends is not recited in **claim1**; the examiner suggests the dependency of **claim 7** should be **claim 2**.

G) In **Claims 7** and **10 replace** "**RE pre-pulses**" with **RF pre-pulses**.

H) In **claim 9**, there are no RF pre-pulse due to the typographical error of **claim 7** and earlier antecedent basis problems. The examiner also notes that the dependency seems improper, the examiner is unclear if this claim depends from **claim 7**, or **claim 8**.

I) **Claim 10** is a duplicate of **claim 7** the claim should be canceled or amended to have a different dependency.

J) Claim 11, is an apparatus claims therefore applicant needs to positively recite all features, (i.e. replace passive verbs with active ones) and remove "intended use" phases such as "for" and "to" in order to ensure that all claimed features are given full patentable weight. The words "configured to" are not intended use because the function is connected to the limitation that precedes it.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. **Claims 1-13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yao et al.**, US patent 4,885,542 issued December 5th 1989.

12. With respect to **Claim 1**, **Yao et al.,** teaches and suggests "A method for Optimizing Pre-saturation in a scan volume of an MRI system", because the calibration pulses applied to each slice are done to prevent and counteract the drift of the static

magnetic field, which is an optimization. [See abstract, col. 3 line 62 through col. 15 line 2] "comprising: **a)** "creating a Bo" calibration "map for each slice of the scan volume"; [See col. 7 line 20 through col. 8 line 59, especially col. 7lines 20-50] "**b)** obtaining a first frequency (i.e. an initial frequency) "for RF pre-pulses;" [See col. 5 line 56 through col. 15 line 43] "**c)** calculating a median value (i.e. the center frequency of the calibration is the median frequency value) "for the Bo magnetic field from the Bo map for each scan slice;" [See col. 7 line 20 through col. 15 line 43; col. 5 line 50 col. 6 line 50].

13. **Yao et al.,** lacks explicitly stating the step of "**d)** calculating the percentage of positive and negative scan slice pixels in each scan slice". However **Yao et al.,** does teach positive and negative frequency drifts where positive and negative, or plus and minus shifts are determined from the center of the image space. [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] Therefore **Yao et al.,** does teach determining the positive and negative frequency shifts (i.e. the positive and negative pixel shifts) for each acquired slice, which is suggestive of the step of "**d)** calculating the percentage" (i.e. the amount) of positive and negative scan slice pixels in each scan slice". [See also Figures 1 through 10, col. 3 line 43 through col. 15 line 43 in general].

14. With respect to **Claim 2**, and corresponding computer program product **claim 12**, **Yao et al.,** teaches, shows and suggests "A method for generating an image of a scan volume using an MRI system" [See figure 6] "the method comprising the steps of: **a)** generating a Bo map of each scan slice of the scan volume by measuring Bo magnetic field distribution over each scan slice of the scan volume;" [See col. 7 line 20 through col. 8 line 59, especially col. 7lines 20-50]; "**b)** obtaining a first frequency (i.e. an initial frequency) "for RF pre-pulses;" [See col. 5 line 56 through col. 15 line 43] "**c)** calculating a median value (i.e. the center frequency of the calibration is the median frequency value) "of the Bo magnetic field over each scan slice, the calculation being done using the Bo field maps;" [See col. 7 line 20 through col.15 line 43; col. 5 line 50 through col. 6 line 50].

15. **Yao et al.,** lacks explicitly stating the step of "**d)** calculating the percentage of positive and negative scan slice pixels in each scan slice". However **Yao et al.,** does teach positive and negative frequency drifts where positive and negative, or plus and minus shifts are determined from the center of the image space. [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] Therefore **Yao et al.,** does teach determining the positive and negative frequency shifts (i.e. the positive and negative pixel shifts) for each acquired slice, which is suggestive of the step of "**d)** calculating the percentage" (i.e. the amount) of positive and negative scan slice pixels in each scan slice". [See also Figures 1 through 10, col. 3 line 43 through col. 15 line 43 in general]. **Yao et al.,** also suggests "the calculation being done using the Bo field map for each scan slice, wherein a positive scan slice pixel is defined as a scan slice pixel with positive value in the Bo (i.e. in **Yao et al.,** Ho is the same thing as Bo) field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the Bo field map;" [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] The two teachings taken together suggest applicant's limitation.

16. **Yao et al.,** lacks explicitly stating the step of "**e)** [~~if~~] **when** the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value" However, **Yao et al.,** teaches that positive frequency pixels and negative frequency pixels are determined relative to the frequency at the central position. [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] The examiner notes that the centered / middle frequency of the actual series of RF calibration pulses is equivalent to a "median" frequency, with the center frequency functioning as a threshold value where all those to one side are positive pixel frequency shifts and those on the opposite side are negative pixel frequency shifts. Therefore, **Yao et al.,** does suggest that the center frequency is used in determining " **when** the percentage of either the positive scan slice pixels or the

negative scan slice pixels in each scan slice is greater than a predefined threshold value" (i.e. the threshold of the predefined center frequency) because the amount of the frequency shift is essentially the percentage of the pixel shift in the image to either the positive or negative direction. [See col. 12 lines 52-64] .

17. Additionally, **Yao et al.,** teaches "calculating a new center frequency" [See col. 8 line 35 through col. 15 line 43] for the next slice's pulse scan which directly suggests "performing the step of: I) calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by using the median value of the Bo magnetic field over the scan slice calculated at step c;" [See col. 8 line 35 through col. 15 line 43; Figures 1-10, abstract]

18. The ability to [~~else~~] **otherwise** "perform the steps of: ii) improving the shimming;" (i.e. reducing eddy current) "and iii) repeating steps **a)** through **e);** is taught by **Yao et al.,** [See col. 3 lines 1-20; col. 10 line 63 through col. 11 line 7; col. 13 lines 1-22; abstract, and as for the repetition see the entire reference since the process is repeated multiple times for each of the multiple slices.]

19. **Yao et al.,** also teaches step **f)** "obtaining an MRI image of each scan slice, wherein the MRI image of a scan slice is obtained using RF pre-pulses at the second frequency for the scan slice." [See figures, 6, 1, 7; col. 10 line 53 through col. 12 line 37] Concerning the computer program product of **claim 12**, **Yao et al.,** teaches "A computer program product for use with a computer, the computer program product comprising a computer usable medium having a computer readable program code embodied therein for generating an image using an MRI system", [See figure 1, col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45].

20. With respect to **Claim 8**, and corresponding computer program product **claim 13**, **Yao et al.,** teaches, shows and suggests "A method for generating an image of a scan volume using an MRI system" [See figure 6] "the method comprising the steps of: **a)** generating a Bo map of each scan slice of the scan volume by measuring Bo magnetic field distribution over each scan slice of the scan volume;" [See col. 7 line 20 through col. 8 line 59, especially col. 7lines 20-50]; "and storing the Bo field map in a database". [See figure 1, col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45]. **Yao et al.,**

also teaches, shows and suggests step "**b)** obtaining a first frequency (i.e. an initial frequency) "for RF pre-pulses;" [See col. 5 line 56 through col. 15 line 43] "**c)** calculating a median value (i.e. the center frequency of the calibration is the median frequency value) "of the Bo magnetic field over each scan slice, the calculation being done using the Bo field maps;" [See col. 7 line 20 through col. 15 line 43; col. 5 line 50 col. 6 line 50] "stored in the database". [See figure 1, col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45].

21. **Yao et al.,** lacks explicitly stating the step of "**d)** calculating the percentage of positive and negative scan slice pixels in each scan slice". However **Yao et al.,** does teach positive and negative frequency drifts where positive and negative, or plus and minus shifts are determined from the center of the image space. [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] Therefore **Yao et al.,** does teach determining the positive and negative frequency shifts (i.e. the positive and negative pixel shifts) for each acquired slice, which is suggestive of the step of "**d)** calculating the percentage" (i.e. the amount) of positive and negative scan slice pixels in each scan slice". [See also Figures 1 through 10, col. 3 line 43 through col. 15 line 43 in general]. **Yao et al.,** also suggests "the calculation being done using the Bo field map for each scan slice, wherein a positive scan slice pixel is defined as a scan slice pixel with positive value in the Bo (i.e. in **Yao et al.,** Ho is the same thing as Bo) field map, and wherein a negative scan slice pixel is defined as a scan slice pixel with negative value in the Bo field map;" [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] The two teachings taken together suggest applicant's limitation.

22. **Yao et al.,** lacks explicitly stating the step of "**e)** [~~if~~] **when** the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value" However, **Yao et al.,** teaches that positive frequency pixels and negative frequency pixels are determined relative to the frequency at the central position. [See col. 7 line 20 through col. 9 line 54 especially col. 8 lines 5-

59] Additionally, **Yao et al.,** teaches the measured frequency shift is also equivalent to a pixel shift. [See col. 12 lines 52-64] The examiner notes that the centered / middle frequency of the actual series of RF calibration pulses is equivalent to a "median" frequency, with the center frequency functioning as a threshold value where all those to one side are positive pixel frequency shifts and those on the opposite side are negative pixel frequency shifts. Therefore, **Yao et al.,** does suggest that the center frequency is used in determining " **when** the percentage of either the positive scan slice pixels or the negative scan slice pixels in each scan slice is greater than a predefined threshold value" (i.e. the threshold of the predefined center frequency) because the amount of the frequency shift is essentially the percentage of the pixel shift in the image to either the positive or negative direction. [See col. 12 lines 52-64] .

23. Additionally, **Yao et al.,** teaches "calculating a new center frequency" [See col. 8 line 35 through col. 15 line 43] for the next slice's pulse scan which directly suggests "performing the step of: I) calculating a second frequency of RF pre-pulses for each scan slice by correcting the first frequency of RF pre-pulses, the correction for a scan slice being done by adding the median value of the Bo magnetic field over the scan slice" (i.e. the center / middle frequency, is interpreted by the examiner as being equivalent to "the median value of the Bo magnetic field over the scan slice") "calculated at step **c)**;" [See col. 8 line 35 through col. 15 line 43; Figures 1-10, abstract] "to the first frequency of RF pre-pulses calculated at step **b)**" [See col. 8 lines 35-59, and the entire reference in general as this feature is a main aspect of the **Yao et al.,** invention.]

24. The ability to [~~else~~] **otherwise** "perform the steps of: ii) improving the shimming;" (i.e. reducing eddy current) "and iii) repeating steps **a)** through **e);** is taught by **Yao et al.,** [See col. 3 lines 1-20; col. 10 line 63 through col. 11 line 7; col. 13 lines 1-22; abstract, and as for the repetition see the entire reference since the process is repeated multiple times for each of the multiple slices.]

25. **Yao et al.,** also teaches steps **f)** "obtaining an MRI image of each scan slice, using RF pre-pulses at the second frequency for the scan slice." [See figures, 6, 1, 7; col. 10 line 53 through col. 12 line 37] **g)** storing the MRI image of each scan slice obtained at step **f)** in the database;" [See figure 1, col. 5 line 5 through col. 15 line 43

especially col. 5 lines 5-45]. "and **h)** displaying the MRI images stored in the database on a display device." [See figures 1, 6; col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45].

26. Concerning the computer program product of **claim 13**, **Yao et al.,** teaches "A computer program product for use with a computer, the computer program product comprising a computer usable medium having a computer readable program code embodied therein for generating an image using an MRI system", [See figure 1, col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45].

27. With respect to **Claim 3**, **Yao et al.,** teaches "the method of **claim** [~~1~~] **2** (the examiner notes that there is no second frequency in **claim 1**, so the examiner is applying claim 3 as if the claim depended from **claim 2**), wherein the step of calculating a second frequency of RF pre-pulses for a scan slice is done by adding the median value of the Bo magnetic field over the scan slice" (i.e. the center / middle frequency, is interpreted by the examiner as being equivalent to "the median value of the Bo magnetic field over the scan slice") "to the first frequency of RF pre-pulses." [See col. 8 lines 35-59] The same reasons for rejection, and obviousness, that apply to **claim 2**, also apply to **claim 3** and need not be reiterated.

28. With respect to **Claim 4**, and corresponding **claim 9**, which depends from **claim 7**, **Yao et al.,** teaches that the calibration pre-pulse data "are used to suppress magnetic resonance signals from hydrogen nuclei in fat molecules present in the scan volume". [See abstract, col. 14 line 1 through col. 15 line 43, especially col. 14 line 56 through col. 15 line 19.] The same reasons for rejection, and obviousness, that apply to **claims 1, 2, 7, 8**, also apply to **claims 4, 9** and need not be reiterated.

29. With respect to **Claim 5**, **Yao et al.,** teaches the calibration pre-pulse data "are used to suppress magnetic resonance signals from hydrogen nuclei in macromolecules present in the scan volume." [See abstract, col. 14 line 1 through col. 15 line 43, especially col. 14 line 56 through col. 14 line 66.] The same reasons for rejection, and obviousness, that apply to **claims 1, 2**, also apply to **claim 5** and need not be reiterated.

30. With respect to **Claim 6**, **Yao et al.,** teaches the calibration pre-pulse data "are used to suppress magnetic resonance signals from hydrogen nuclei in water molecules present in the scan volume." [See abstract, col. 14 line 1 through col. 15 line 43, especially col. 14 line 56 through col. 14 line 66.] The same reasons for rejection, and obviousness, that apply to **claims 1, 2, 4**, also apply to **claim 6** and need not be reiterated.

31. With respect to **Claim 7**, and **duplicate claim 10**, **Yao et al.,** teaches that "the step of obtaining an MRI image of a scan slice comprises the steps of: **a)** applying **i)** RF [E] pre-pulses at second frequency for the scan slice; and **ii)** RF [E] pulses at transmit frequency to the scan slice;" [See abstract, col. 8 line 35 through col. 15 line 43] "**b)** measuring magnetic resonance signals from the scan slice;" [See figures 6, 7, 1; col. 8 line 35 through col. 15 line 43] "and c. processing the magnetic resonance signals to obtain an MRI image of the scan slice." [See figure 6, col. 5 line 5 through col. 15 line 43] The same reasons for rejection, and obviousness, that apply to **claims 1, 2, 8** also apply to **claims 7, 10** and need not be reiterated.

32. With respect to **Claim 11**, **Yao et al.,** teaches, shows and suggests "An MRI system" [See figure 1] "comprising: **a)** a polarizing magnet for producing a high intensity magnetic field called Bo (i.e. Ho) magnetic field;" [See figure 1 the static cryogenic z axis magnet component]. "**c)** a magnetic field detector for measuring Bo magnetic field distribution;" [See RF receiver component 22 of figure 1, and the reception coils of component 16] "**d)** a set of gradient coils for producing a gradient magnetic field superposed on the Bo magnetic field;" [See component 14 of figure 1] "**e)** a transmitter for generating RF pulses and RF pre-pulses wherein frequency of RF pre-pulses is specific for each scan slice;" [See RF xmtr component 20 of figure 1]. "**f)** a radio frequency receiver for detecting magnetic resonance signals" [See RF receiver component 22 of figure 1].

33. **Yao et al.,** also teaches, shows and suggests "**g)** a processing module" (i.e. components 24, 26, 28 and 30 in combination of figure 1, see also figure 6, and col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45]. Additionally, the processing of **Yao et al.,** necessarily occurs within sections of the **Yao et al.,** processor which carries

out the limitations of **claims 1, 2, 8, 12,** and **13** therefore **Yao et al.,** teaches, shows, suggests and lacks directly stating but still suggests the limitations of: "i) a module for calculating the median of the Bo magnetic field over each scan slice; ii) a module for calculating the percentage of positive and negative scan slice pixels in each scan slice, wherein positive scan slice pixels are defined as scan slice pixels with positive Bo magnetic field values, and wherein negative scan slice pixels are defined as scan slice pixels with negative Bo magnetic field values; iii) a module for calculating a second frequency of RF pre-pulses for each scan slice by adding the median value of the Bo magnetic field over the scan slice to a first frequency of RF pre-pulses, the first frequency of RF pre-pulses being obtained by a standard procedure; and iv) a module for processing magnetic resonance signals from a scan slice to obtain an MRI image of the scan slice-pulses for each scan slice;" for the same reasons as those already provided in the rejections of **claims 1, 2, 8, 12,** and **13** which need not be reiterated

34. Additionally, **Yao et al.,** also teaches, shows and suggests in combination with the above limitations the components of "**h)** a database comprising: [See figure 1 component 26; col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45]. "**i)** a storage unit for storing Bo field maps; [See figure 1 component 26; col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45], "**ii)** a second storage unit for storing the median value of the B.sub.0 magnetic field over each scan slice;" [See figure 1 component 26; col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45], and "**iii)** a third storage unit for storing an MRI image of each scan slice." [See figure 1 component 26; col. 5 line 5 through col. 15 line 43 especially col. 5 lines 5-45], The examiner notes that in the **Yao et al.,** reference intrinsically has separate processing modules for each step because the **Yao et al.,** reference uses a conventional computer.

35. **Yao et al.,** lacks explicitly showing limitation "**b)** a set of shimming coils for improving Bo magnetic field homogeneity; however, the method of **Yao et al.,** uses the control computer 24 with its phase / frequency correction means to adjust (i.e. shim) the magnetic fields produced by the RF coils 16, and the gradient coils 14, in accordance with the disclosed method to reduce eddy current errors and make the magnetic fields more homogeneous, therefore control computer with the frequency / phase correction

means 24 which operationally effects components 14 and 16 fulfills the function of a set of shimming coils. [See abstract, figures 1-10 col. 1 line 1 through col. 15 line 43] Therefore it would have been obvious to one of ordinary skill in the art at the time that the invention was made that a shimming means (i.e. eddy current reduction means, magnetic field homogenizing means) is an aspect of the **Yao et al.,** reference. The same reasons for rejection, and obviousness, that apply to **claims 1-10,** and **12-13** also apply to **claim 11** and need not be reiterated.

36. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) **Zhou et al.**, US patent 6,064,205 issued May 16th 2000.
B) **Froundlich et al.**, US patent 6,559,644B2 issued May 6th 2003, filed May 30th 2001. [This reference teaches using Median as opposed to mean measurements to determine a correction frequency when the concern is static magnetic field drift.[See col. 5 lines 12-17; col. 5 lines 25-43; col. 5 lines 53-60; col. 6 lines 3-9; col. 1 lines 53-55]

C) **Froundlich et al.**, US patent application publication 2002/0180438 A1 published December 5th 2002, filed May 30th 2001 which corresponds to **Froundlich et al.**, US patent 6,559,644B2 issued May 6th 2003, filed May 30th 2001. [This reference also teaches using Median as opposed to mean measurements to determine a correction frequency when the concern is static magnetic field drift.
D) **Kaufman et al.**, US patent 4,970,457 issued Nov. 13th 1990, which cites the **Yao et al.**, reference applied above.
E) **Wicklow et al.**, US patent 6,515,478 B1 issued Feb. 4th 2003, filed June 29th 2000.

Conclusion

37. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

38. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(703) 872-9306**.

Tiffany A. Fetzner
TAF
March 20, 2005

for 3.20.05
Diego Gutierrez
Supervisory Patent Examiner
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